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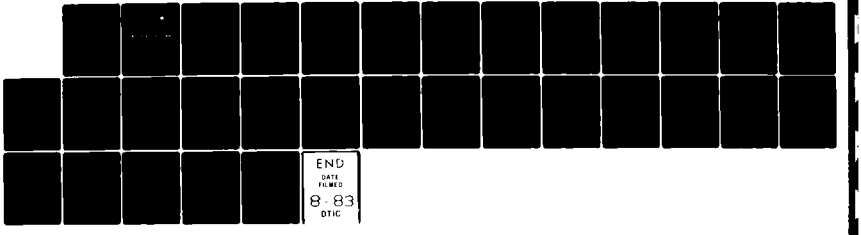

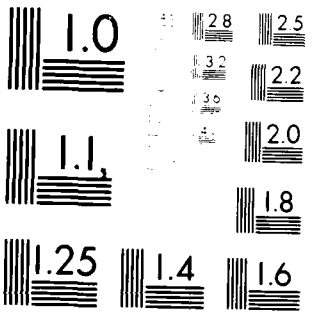

ITEM ESSENTIALITY DEVELOPMENT

OPERATIONS ANALYSIS DEPARTMENT

NAVY FLEET MATERIAL SUPPORT OFFICE

Mechanicsburg, Pennsylvania 17055

Report 154

ITEM ESSENTIALITY DEVELOPMENT

REPORT 154

PROJECT NO. 9322-D95-2081

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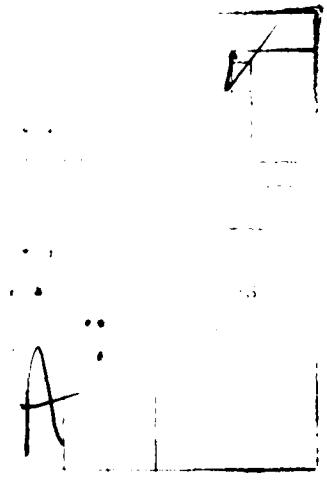

Abstract

Item Mission Essentiality Codes (IMECs) were developed based on Military Essentiality Codes (MECs) and Mission Criticality Codes (MCCs). The IMEC represents the importance of an item to the mission assignment of the military unit in which the item is installed. Most items were assigned more than one IMEC value because each application of an item received an IMEC. The study focused on selecting a unique essentiality value for a National Item Identification Number (NIIN) by considering the various IMECs assigned to the item. The analysis was performed on 7G and 7H cognizance symbol (cog) material managed by the Navy Ships Parts Control Center (SPCC).

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Executive Summary

1. Background. Current Uniform Inventory Control Program (UICP) wholesale levels computations include item essentiality, but differentiation does not exist because all items are considered with identical essentiality. The Item Mission Essentiality Code (IMEC), ranging from 1 to 4 in this analysis, represents the importance of an item to the mission assignment of the military unit in which the item is installed. Most items are assigned more than one IMEC value due to multiple applications.

2. Objective. To analyze various methods of assigning a unique item essentiality value when the item has multiple applications with different IMECs.

3. Technical Approach. To determine the Item Essentiality value for an item, seven different methods were analyzed with three rounding techniques applied to four of the methods. Some of the methods included: the highest IMEC, the most frequent IMEC, an application weighted average, a population weighted average and IMEC weighted averages. Many applications were not assigned IMECs because of insufficient data. These applications were assigned values of 1s and 4s to illustrate the extreme outcome possibilities when the information becomes available. Most of the input data was obtained from the Weapons System File (WSF).

4. Results. Distributions were produced by the various Item Essentiality determining methods to show the percent of items for which each Item Essentiality value was assigned. The methods shown in TABLE I rounded fractions up. (That is, all fractions were rounded to the next larger integer; e.g., 2.1 = 3.)

TABLE I
Item Essentiality Distribution
Percentages of 7C and 7E Cog Items

	Item Essentiality Values			
Method	1	2	3	4
Highest	18	21	46	15
Mode	32	25	38	5
Ratios	30	23	48	9
APL/EIC/UIC	18	36	41	5
Population	18	36	41	5
APL/EIC/UIC/IMFC	18	21	49	12
Population/IMFC	18	21	49	12
Desired Dist.	15	40	40	5

The Allowance Parts List (APL)/Equipment Identification Code (EIC)/Unit Identification Code (UIC) weighted average and the Population weighted average produced results which most closely resemble the Desired Distribution that was approved by ASD(MRA&L) memorandum of 15 October 1981. The APL/EIC/UIC and Population weighted averages were also least susceptible to extreme values when 1s and 4s were substituted for applications which were not assigned IMFC values. However, input data was easier to collect and maintain for the APL/EIC/UIC weighted average than the Population weighted average. Therefore, the APL/EIC/UIC weighted average was selected to determine Item Essentiality for SPCC-managed repairable items.

5. Recommendations. An APL/EIC/UIC weighted average is recommended for developing Item Essentiality values for SPCC at the wholesale level of the supply system. Also, it is recommended that a PICP program be developed to compute, load and maintain the Item Essentiality Code.

I. INTRODUCTION

Current Uniform Inventory Control Program (UICP) levels computations include an item essentiality factor. However, differentiation in item essentiality does not exist because all Navy Ships Parts Control Center (SPCC)-managed items are assigned a value of .5 and all Navy Aviation Supply Office (ASO)-managed items are assigned a value of .01. Therefore, Naval Supply Systems Command (COMNAVSUPSYSCOM) tasked Navy Fleet Material Support Office (FMSO) by reference (1), Appendix A, to conduct an Operations Analysis study as defined in reference (2), Appendix A, to develop Item Essentiality values for SPCC-managed repairable items based upon Item Mission Essentiality Codes (IMECs). IMECs were previously developed based on Military Essentiality Codes (MECs) and Mission Criticality Codes (MCCs).

An MEC represents the importance of an item to a component, an MCC relates the importance of a component to a military assignment and an IMEC indicates the importance of an item to the mission assignment of the military unit in which the item is installed. An IMEC was assigned for every application of an item. Only 6% of the items included in this study were assigned a unique IMEC as a result of the item having only one application or because each application of the item was assigned the same IMEC value. Since 94% of the items were assigned at least two different IMEC values due to multiple applications, the study focused on developing a methodology for determining a unique IMEC for items which have multiple applications with different IMECs. This unique IMEC for each item was identified as an Item Essentiality value. Therefore, essentiality for a particular application of an item is identified as an IMEC, and essentiality of the item (as defined by an individual National Item Identification Number (NIIN)) to the Navy is identified as Item Essentiality.

The MEC is assigned values 1 or 3, with 1 signifying that the item is vital and 3 indicating the item is nonessential to the component on which the item is installed. The MCC values range from 1 through 5 and A through E, with values 1 through 5 being synonomous with A through E; e.g., 1 equals A and 2 equals B. An MCC of 1 signifies the component is least essential and an MCC of 5 implies the component is vital. The IMEC and Item Essentiality are assigned values 1 through 5, with 1 indicating the item is least essential and 5 signifying the item is vital to the mission assignment of the military unit in which the item is installed. Since less than 1% of the IMECs and MCCs were 5s, which represent life support equipment; e.g., life rafts, this material was treated as 4s in the study.

The MCC development concept was based on Casualty Reports (CASREPs) and was documented in reference (3), Appendix A. The four steps shown here explain the process for developing MCCs:

- MCC 4 was assigned if the ratio of C3 plus C4 CASREPs to C2 CASREPs was at least one to five and the ratio of C4 to C3 CASREPs was at least one to three; i.e., $\frac{C3+C4}{C2} \geq \frac{1}{5}$ and $\frac{C4}{C3} \geq \frac{1}{3}$.
- MCC 3 was assigned if the ratio of C3 plus C4 CASREPs to C2 CASREPs was at least one to five, but the ratio of C4 to C3 CASREPs was less than one to three; i.e., $\frac{C3+C4}{C2} \geq \frac{1}{5}$ and $\frac{C4}{C3} < \frac{1}{3}$.
- MCC 2 was assigned if the ratio of C3 plus C4 CASREPs to C2 CASREPs was less than one to five; i.e., $\frac{C3+C4}{C2} < \frac{1}{5}$.
- MCC 1 was assigned if there were no historical CASREPs.

TABLE I shows the IMEC value which is assigned for each of the possible combinations of MEC and MCC values. When the MEC is 1, the IMEC is assigned the same value as the MCC, and when the MEC is 3, the IMEC is assigned a value of 1. Ninety-eight percent of the MEC values are 1.

TABLE I
IMEC Determination

MEC Item to Component (DEN C008E)	MCC Component to Mission (DEN C003Y)	IMEC Item to Mission (Proposed DEN C008C)
1	5 or E	4
1	4 or D	4
1	3 or C	3
1	2 or B	2
1	1 or A	1
3	Any of Above	1

NOTE: DEN is an abbreviation for Data Element Number

II. TECHNICAL APPROACH

A. ITEM ESSENTIALITY DETERMINATION. Fifteen methods were analyzed for determining an Item Essentiality value for each NIIN regardless of the number of applications for the item. Input items which were assigned one IMEC value as a result of having only one application or having the same IMEC value assigned for all applications were also processed by each method. Although the Item Essentiality for these particular items was the same for every method, the items were included in the results to show the Item Essentiality distribution for all active SPCC-managed repairables for which sufficient data was available. Many input records did not contain IMECs because of insufficient data and were processed in three manners:

- Excluded from processing
- Assigned IMEC values of 1
- Assigned IMEC values of 4

Assigning values of 1 and 4 to undefined IMECs allows one to observe the extreme values possible in each method.

The 15 methods of determining Item Essentiality values are listed below:

- Highest
- Mode
- Ratios
- APL/EIC/UIC Weighted Average (fractions rounded down)
- APL/EIC/UIC Weighted Average (fractions rounded off)
- APL/EIC/UIC Weighted Average (fractions rounded up)
- Population Weighted Average (fractions rounded down)
- Population Weighted Average (fractions rounded off)
- Population Weighted Average (fractions rounded up)
- APL/EIC/UIC Weighted IMEC Weighted Average (fractions rounded down)
- APL/EIC/UIC Weighted IMEC Weighted Average (fractions rounded off)
- APL/EIC/UIC Weighted IMEC Weighted Average (fractions rounded up)
- Population Weighted IMEC Weighted Average (fractions rounded down)
- Population Weighted IMEC Weighted Average (fractions rounded off)
- Population Weighted IMEC Weighted Average (fractions rounded up)

There are basically seven methods with three rounding techniques applied to four of the methods. Each of the methods are described below, and examples using the data from TABLE II are presented to explain the computations. The data represents IMEC values and corresponding populations of four different applications of the same item (NIIN).

TABLE II
Example Data

IMEC	Population
1	10
2	5
2	3
4	4

1. Highest - the highest; i.e., the most vital, IMEC assigned to an application of an item is assigned as the Item Essentiality value for the item. An Item Essentiality value of 4 is assigned to the example item.

2. Mode - the IMEC which is assigned most frequently to applications of the item is assigned as the Item Essentiality for the item. In bimodel situations; i.e., two or more modes occur, the more vital (higher) IMEC is selected. The example item is assigned an Item Essentiality of 2 for this method.

3. Ratios - this method is similar to the MCC development concept with the exception that IMECs for the various applications of the same NIIN are used instead of CASREPs.

- Item Essentiality 4 is assigned if the ratio of the sum of IMEC 3s and 4s to IMEC 2s is at least one to five, and the ratio of IMEC 4s to 3s is at least one to three.

$$\frac{3s + 4s}{2s} \geq \frac{1}{5} \text{ and } \frac{4s}{3s} \geq \frac{1}{3}$$

- Item Essentiality 3 is assigned if the ratio of the sum of IMEC 3s and 4s to IMEC 2s is at least one to five, but the ratio of IMEC 4s to 3s is less than one to three.

$$\frac{3s + 4s}{2s} \geq \frac{1}{5} \text{ and } \frac{4s}{3s} < \frac{1}{3}$$

- Item Essentiality 2 is assigned if the ratio of the sum of IMEC 3s and 4s to IMEC 2s is less than one to five, but not equal to zero. If there are no IMEC 3s or 4s, IMEC 2 is assigned only if the ratio of IMEC 2s to 1s is greater than or equal to one to three.

$$\frac{3s + 4s}{2s} < \frac{1}{5} \text{ , except if } 3s + 4s = 0 \text{ and } \frac{2s}{1s} \geq \frac{1}{3}$$

- Item Essentiality 1 is assigned if there are no IMEC 3s or 4s, and the ratio of IMEC 2s to 1s is less than one to three.

$$3s + 4s = 0 \text{ and } \frac{2s}{1s} < \frac{1}{3}$$

For the example item, the ratio of the sum of IMEC 3s and 4s to IMEC 2s is one to two. Since this is greater than one to five, the ratio of IMEC 4s to 3s must be computed. The ratio of 4s to 3s is greater than one to three. Therefore, the example item is assigned an Item Essentiality of 4.

4. APL/EIC/UIC Weighted Average (fractions rounded down) - the Item Essentiality is assigned by using an application weighted average. The equation below illustrates the computations involved with this method, which is the same as applying an arithmetic mean to the input file. All fractions in this method are rounded down to the next lower integer; e.g., 2.9 = 2.

$$\frac{\sum_{i=1}^{4} R_i \, i}{\sum_{i=1}^{4} R_i}$$

where

i = IMEC value

R_i = applications (records) for the item for IMEC i

Example: $\frac{(1x1) + (2x2) + (0x3) + (1x4)}{1 + 2 + 0 + 1} = 9/4 = 2.25$

The numerator and denominator of the equation above are explained as follows: one application had an IMEC 1, two applications had IMEC 2, zero applications had IMEC 3 and one application had an IMEC 4. With fractions rounded down, the item is assigned an essentiality of 2.

5. APL/EIC/UIC Weighted Average (fractions rounded off) - Item Essentiality is assigned in a similar manner as Method 4 with the exception that fractions are rounded off. That is, fractions of .5 and greater are rounded up to the next higher integer, and fractions less than .5 are rounded

down to the next lower integer; e..g, 2.4 = 2 and 2.5 = 3. With fractions rounded off, the 2.25 computed above is rounded to 2.

6. APL/EIC/UIC Weighted Average (fractions rounded up) - Item Essentiality is assigned in a similar manner as Method 4 with the exception that fractions are always rounded up to the next higher integer; e.g., 2.1 = 3. With fractions rounded up, the 2.25 computed above is rounded to 3.

7. Population Weighted Average (fractions rounded down) - the Item Essentiality is assigned using a population weighted average. The equation below illustrates the computation of this method. All fractions are rounded down.

$$\frac{\sum_{i=1}^{4} P_i \, i}{\sum_{i=1}^{4} P_i}$$

where

i = IMEC value

P_i = population of the item for IMEC i

Example: $\frac{(10x1) + (8x2) + (0x3) + (4x4)}{10 + 8 + 0 + 4} = \frac{42}{22} = 1.91$

The numerator and denominator of the equation above are explained as follows: a population of 10 corresponds to the application with an IMEC 1, a population of 8 corresponds to the applications with IMEC 2, zero IMEC 3s are observed and a population of 4 corresponds to the application with an IMEC 4. With fractions rounded down, the item is assigned an essentiality of 1.

8. Population Weighted Average (fractions rounded off) - Item Essentiality is assigned in a similar manner as Method 7 with the exception that fractions are rounded at .5. With fractions rounded off, the example item is assigned an essentiality of 2.

9. Population Weighted Average (fractions rounded up) - Item Essentiality is assigned in a similar manner as Method 7 with the exception that fractions are always rounded up. With fractions rounded up, the example item is assigned an essentiality of 2.

10. APL/EIC/UIC Weighted IMEC Weighted Average (fractions rounded down) - Item Essentiality is assigned in a similar manner as Method 4 with the addition that the more vital IMECs were given more weight in this method. The equation below illustrates the computation of this method. All fractions are rounded down.

$$\frac{\sum_{i=1}^{4} W_i R_i i}{\sum_{i=1}^{4} W_i R_i}$$

where

i = IMEC value

R_i = applications for the item for IMEC i

W_i = parameter value which varied according to i as shown below:

i	W
1	1
2	10
3	50
4	100

These particular weighting factors are derived from reference (4), Appendix A.

Example: $\frac{(1x1x1) + (10x2x2) + (50x0x3) + (100x1x4)}{(1x1) + (10x2) + (50x0) + (100x1)} = \frac{441}{121} = 3.64$

This example is identical to the equation in the example of Method 4 except for the addition of the weighting factors. With fractions rounded down, the example item is assigned an essentiality of 3.

11. APL/EIC/UIC Weighted IMEC Weighted Average (fractions rounded off) - Item Essentiality is assigned in a manner similar to Method 10 with the exception that fractions are rounded off. With fractions rounded off, the example item is assigned an essentiality of 4.

12. APL/EIC/UIC Weighted IMEC Weighted Average (fractions rounded up) - Item Essentiality is assigned in a manner similar to Method 10 with the exception that fractions are always rounded up. With fractions rounded up, the example item is assigned an essentiality of 4.

13. Population Weighted IMEC Weighted Average (fractions rounded down) - Item Essentiality is assigned in a manner similar to Method 7 with the addition that the more vital IMECs are given more weight in this method. The below algorithm illustrates the computation of this method. All fractions are rounded down.

$$\frac{\sum_{i=1}^{4} W_i P_i i}{\sum_{i=1}^{4} W_i P_i}$$

where

i = IMEC value

P_i = population of the item for IMEC i

W_i = parameter value which varies according to i as shown below:

i	W
1	1
2	10
3	50
4	100

Example: $\frac{(1x10x1) + (10x8x2) + (50x0x3) + (100x4x4)}{(1x10) + (10x8) + (50x0) + (100x4)} = \frac{1770}{490} = 3.61$

This equation is identical to the equation for the example of Method 7 except for the addition of the weighting factors. With fractions rounded down, the item is assigned an essentiality of 3.

14. Population Weighted IMEC Weighted Average (fractions rounded off) - Item Essentiality is assigned in a similar manner to Method 13 with the exception that fractions are rounded off. With fractions rounded off, the item is assigned an essentiality of 4.

15. Population Weighted IMEC Weighted Average (fractions rounded up) - Item Essentiality is assigned in a similar manner to Method 13 with the exception that fractions are always rounded up. With fractions rounded up, the item was assigned an essentiality of 4.

B. INPUT DEVELOPMENT. The Master Data File (MDF) was the source from which NIIN/APL relationships were obtained for active 7G and 7H cognizance symbol (cog) items. (In general, an item is considered active if any of the current demand, repair or leadtime observations are greater than zero. Appendix B contains the active item criteria.) The APL/UIC relationships were acquired from Level 25 of the WSF, and EICs and MCCs were obtained from Level 17 of the WSF. However, a large majority of the MCCs were not available from the WSF and were extracted from the MCC worktape which was developed during reference (3), Appendix A. Separate input records were created for each different application of an item; i.e., NIIN/APL/EIC/UIC combination. Therefore, items were assigned more than one IMEC value unless the item had only one application or each application of the item was assigned the same IMEC value. Sixty-one percent of the input records did not contain EICs and were not assigned an IMEC because (as reference (3), Appendix A, explains) EICs were necessary to develop MCCs which in turn were required to develop IMECs. A more detailed description of the input development is contained in Appendix C.

The item and record counts of the universe input for this study are shown below in TABLE III.

TABLE III
Universe

Cog	Items	Records
7H	18,786	1,053,547
7G	5,906	474,055

The input item and record counts shown below are for items which were assigned one IMEC either because the item had only one application or each application was assigned the same IMEC.

TABLE IV
Unique IMECs

Cog	Items	Records
7H	1,483	7,921
7G	71	153

The item and record counts below indicate the items in which every record (application) for the item contained an IMEC value. (The information in TABLE IV is a subset of the data in TABLE V.)

TABLE V
Complete Information

Cog	Items	Records
7H	3,294	23,620
7G	289	1,522

TABLE VI shows the IMEC distribution of all input records for which there were appropriate data to develop IMECs.

TABLE V
Input Record IMEC Distribution

	IMEC Values			
Type	1	2	3	4
# IR	26	24	46	4
% IR	28	26	46	3

C. EVALUATION CRITERIA. The desired Item Essentiality distribution, shown in TABLE VII, was proposed by reference (5), Appendix A, and approved by reference (6), Appendix A.

TABLE VII
Desired Item Essentiality Distribution

	Item Essentiality Values			
	1	2	3	4
% Items	15	40	40	5

Item Essentiality distributions in a format similar to TABLE VII were produced for all 15 Item Essentiality determining methods. The decision criteria to select the procedure for developing Item Essentiality for SPCC-managed repairable items was to identify the method which generated resulting values that most closely resemble the above distribution.

III. FINDINGS

The Item Essentiality distributions produced by the 15 different methods are displayed below in TABLE VIII. Records without IMEC values due to insufficient data were excluded from these results. The results include items with unique IMEC values as well as items assigned more than one IMEC value due to multiple applications.

TABLE VIII
Item Essentiality Distribution
Percentages of 7G and 7H Cog Items

Method	Item Essentiality Values			
	1	2	3	4
Highest	18	21	48	13
Mode	32	25	38	5
Ratios	20	23	48	9
APL/EIC/UIC (down)	46	37	15	2
APL/EIC/UIC (off)	27	36	34	3
APL/EIC/UIC (up)	18	36	41	5
Pop (down)	45	38	15	2
Pop (off)	26	37	34	3
Pop (up)	18	36	41	5
APL/EIC/UIC/IMEC (down)	32	44	22	2
APL/EIC/UIC/IMEC (off)	18	25	50	7
APL/EIC/UIC/IMEC (up)	18	21	49	12
Pop/IMEC (down)	32	44	22	2
Pop/IMEC (off)	18	25	50	7
Pop/IMEC (up)	18	21	49	12
Desired Dist.	15	40	40	5

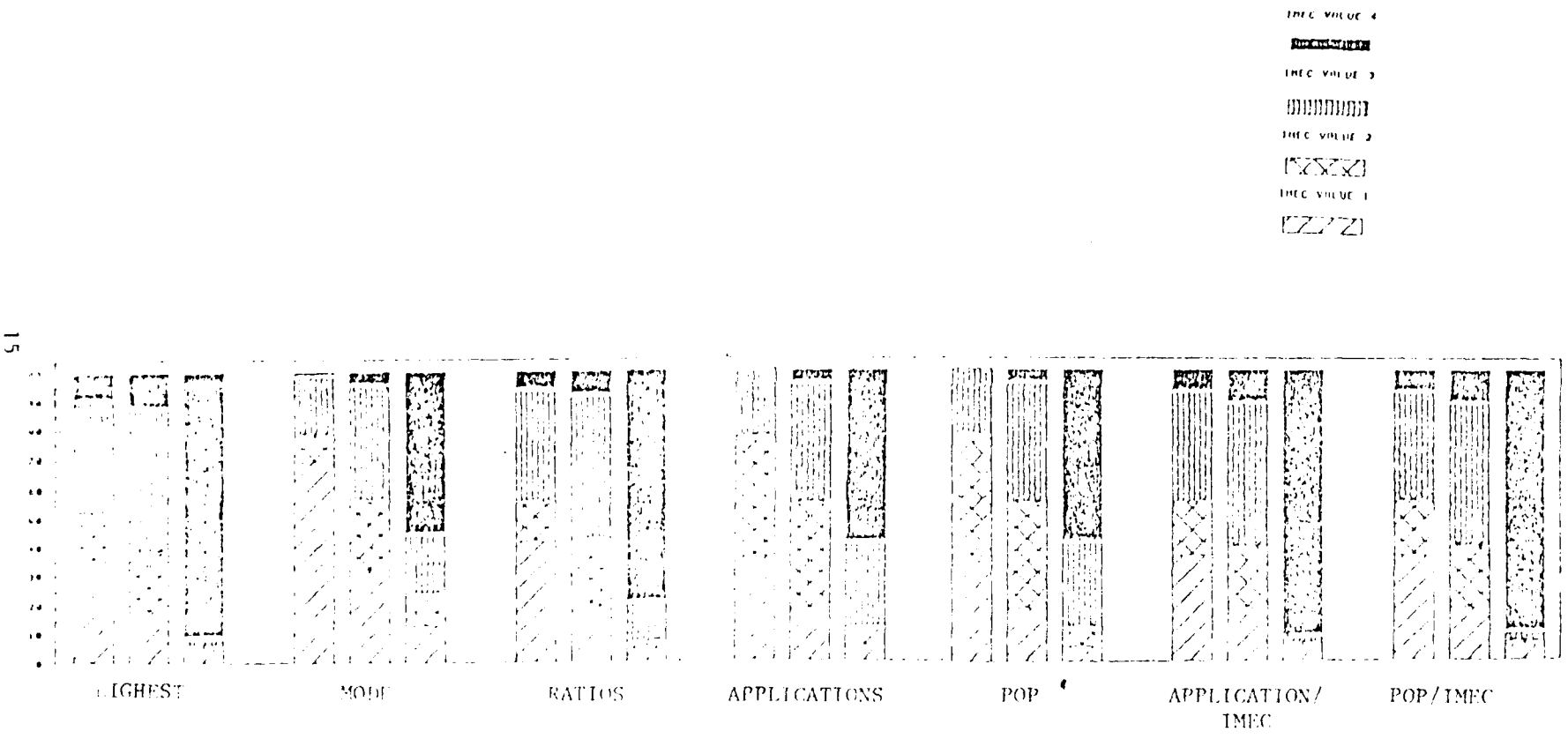
When comparing the results of the various methods to the desired distribution, the Highest and Ratios methods assigned approximately 60% of the items with Item Essentiality values of 3 or 4. The Mode generated 32% Item Essentiality values of 1 versus the desired 15%. When the same rounding technique was applied, the APL/EIC/UIC (Application) weighted average and Population (Pop) weighted average produced nearly identical results. Hence, the Application/IMEC weighted average and the Pop/IMEC weighted average also show identical results to each other since the two techniques were weighted the same. Rounding fractions off and down for the Application and Population weighted averages produced two and three times as many Item Essentiality values of 1 than the desired distribution. The large percentage of 1s resulted in too few 3s and 4s. The Application and Pop weighted averages produced results very similar to the desired distribution when fractions were rounded up. Rounding fractions down using the Application/IMEC weighted and

Pop/IMEC weighted averages assigned twice as many items with values of 1 and half as many items with values of 3 and 4 when compared to the desired distribution. Rounding fractions off and up for the Application/IMEC and Pop/IMEC weighted averages produced about 60% Item Essentiality values of 3 and 4, and too few values of 2.

As previously stated, the input was processed in three different manners to assess the variability of each method. TABLE IX expresses the results from the three processing techniques with the use of bar graphs. The results from rounding fractions down and off were excluded from the table for simplicity. Since the purpose of the table is to show the variability in each method, including only the results of rounding fractions up reflects the variability in the computation for all rounding procedures. There are three bars representing the three processing techniques for all seven methods of comparison. The first bar shown above each method, expresses the results for that method when the value of 1 was substituted for the IMECs of records which were not assigned IMEC values due to a lack of information. The middle bar represents the results from TABLE VIII in which records without IMECs were excluded from processing. The bar on the right of the set, illustrates the results of substituting a value of 4 for IMECs of records which were not assigned IMEC values.

TABLE IX

Sensitivity to Undefined IMECs



NOTE: All fractions were rounded up.

The following methods produced a large percentage (approximately 90%) of Item Essentiality 4s when the value of 4 was substituted for the IMECs of records without IMEC values: Highest, Ratios, Application/IMEC weighted average and Pop/IMEC weighted average. The Mode generated about 70% Item Essentiality values of 1 when 1s were substituted for IMECs without information. The Application and Population weighted averages were most resistent to extremes when 1s and 4s were used for IMECs of records that did not contain IMEC values. Therefore, these methods are least susceptible to change when information becomes available to assign IMEC values to all applications of every item. Less information is required to implement and maintain the Application weighted average than the Population weighted average. The information required for the Application weighted average is a subset of the data required for the Population weighted average.

IV. SUMMARY AND CONCLUSIONS

Because of the ineffective essentiality coding scheme currently employed in UICP, reference (1), Appendix A, tasked FMSO with an Operations Analysis study to develop Item Essentiality based on IMECs. Since most items have multiple applications for which various IMEC values are assigned, this analysis compared seven computational methods with three rounding procedures to determine a unique Item Essentiality value for an item regardless of the number of applications. Because of insufficient data; i.e., four digit EIC values, IMEC values were indeterminable for 61% of the input records. Therefore, variability tests were developed to decide which methods were most susceptible to change when the EICs were obtained and IMECs were available for every application of all items. Distributions were produced for each Item Essentiality method to show the percent of items for which each Item

Essentiality value was assigned. According to reference (5), Appendix A, the desired Item Essentiality distribution is shown below in TABLE X. The Application weighted average rounding fractions up produced results most closely resembling the desired distribution and is also shown in TABLE X.

TABLE X
Desired vs. Application Weighted Item Essentiality Distribution

	Item Essentiality Values			
	1	2	3	4
Desired Distribution	15	40	40	5
Application Weighted	18	36	41	5

The recommended method was selected based on the following criteria: (1) generated Item Essentiality distribution, (2) ease in implementing and maintaining and (3) susceptibility to fluctuation.

V. RECOMMENDATION

FMSO recommends the following:

1. Determine Item Essentiality for SPCC-managed repairables using an APL/EIC/UIC (Application) weighted average rounding fractions up.

2. Develop a UICP program to compute, load and maintain the Item Essentiality codes.

APPENDIX A: REFERENCES

1. COMNAVSUPSYSCOM ltr 04A6/LJB of 24 Mar 1981

2. FMSO ltr 9322-D95/JL7/141 5250 of 18 May 1981

3. Operations Analysis Report 143

4. SPCC ltr 340/WEB/169 4400 of 6 Apr 1982

5. CNO memo Ser 413T/2973834 of 28 Jul 1961

6. ASD(MRA&L) memo of 15 Oct 1981

APPENDIX B: ACTIVE ITEM CRITERIA FROM U406X

An item is designated as "active" if any one of the following criteria is met.

1. Any of the following Data Element Numbers (DENs) are > 0.

A004A	System Recurring Demand Frequency Observation
A005	Current System Recurring Maintenance Demand Observation
A005A	Current System Recurring Overhaul Demand Observation
A005B	Current System Carcass Return Observation
A005C	Current System Other Service Demand Observation
A006	Current System Nonrecurring Demand Observation

2. Any Issue Observation (A006C Current System Issue Observation) purpose code other than A or W > 0.

3. Item is MARK 2, 3, or 4 (B067B, C, D).

4. Numeric DRIPR Code for any one of DENs B001A, B, C, D, or E.

5. System Order Quantity (B021) = 0.

6. Any of the leadtime observations > 0.

B010G	Cumulative Production Leadtime Observation
B011G	Cumulative Procurement Leadtime Observation

7. Any of the Repairable DENS > 0.

F009D	Cumulative Repair Induction Quantity
B012G	Cumulative Navy Reporting Repair in Process Time Observation
B012K	Cumulative Navy Nonreporting and Commercial Repair TAT Observation

8. Item is in a family (C001A = Blank).

9. System Internal Due-In, Purpose Code A and Condition Code A (A005) > 0.

10. Item has Maintenance Demand Observation History Code (B052) other than a space.

APPENDIX C: INPUT FILE DEVELOPMENT

The purpose of this appendix is to describe how the data elements needed to calculate the IMECs for 7H and 7G cognizance symbol (cog) active items were developed. A Computation and Research Evaluation System (CARES) input file of 7H and 7G active items provided the National Item Identification Numbers (NIINs) for this study. Level 17 of the Weapons System File (WSF), Level 25 of the WSF and the Master Data File (MDF) were used to develop the data. The MDF was used to develop the NIIN to Allowance Parts List (APL) relationships and Level 25 of the WSF developed the APL to UIC relationships. Level 25 of the WSF was also used to extract needed data elements from Level 17 of WSF. TABLE I indicates what data elements were extracted from each of these data files (the DEN for the data element is in parenthesis).

TABLE 1
Data Elements Needed to Calculate the IMECs

	DENs
Level 17 of the WSF	
UIC - Unit Identification Code	(D008)
UIC AINAC - UIC Application/Identification Number Activity Code	(D029)
APL - Allowance Parts List	(D008)
APL AINAC	(D029)
RIN - Record Identification Number	(E221)
RIN POP - RIN Population	(D011)
EIC - Equipment Identification Code	(D008D)
MCC - Mission Criticality Code	(C003Y)
Level 25 of the WSF	
UIC	(D008)
UIC AINAC	(D029)
APL	(D008)
APL AINAC	(D029)
QTY PER APPL - Quantity per Application	(D011)
MDF	
NIIN - National Item Identification Number	(D046D)
COG - Cognizance	(C003)
FSC - Federal Supply Class	(C042)
APL	(D009)
APL AINAC	(D029)
NIIN to APL POP	(D011)
PART TO COMP MEC - Part to Component Military Essentiality Code	(C008E)

The data elements from these three files were consolidated resulting in unique data records per NIIN/APL/Record Identification Number (RIN)/Unit Identification Code (UIC) combination. Ship Type and Hull Number (STHN) were extracted from the Visibility and Management of Support Costs (VAMOSC) file and added to the data record. The STHN and Equipment Identification Code (EIC) for each record were converted to a ship class and lead EIC, respectively.

Mission Criticality Codes (MCCs) were extracted from the MCC worktape based on the ship class and lead EIC and added to the data record. If a record already contained an MCC from Level 17 of the WSF, it was overridden by the MCC from the worktape since the MCC worktape contained more recent data. Records with incomplete EICs were coded "Z" in the MCC data field while records with complete EICs but no match with the MCC worktape were coded with a "1" MCC. The RIN POP was summed across identical NIIN/APL/EIC/UIC records resulting in unique data records per NIIN/APL/EIC/UIC. An Item Military Essentiality Code (IMEC) was determined for each record based on the MCC and Military Essentiality Code (MEC) as shown in TABLE II.

TABLE II
IMEC Determination Based on the MCC and the MEC

MCC	MEC	IMEC
5 or E	1	4
4 or D	1	4
3 or C	1	3
2 or B	1	2
1 or A	1	1
Z	Any of Above	blank
Any of Above	3	1
Any of Above	5	4

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13 ABSTRACT

Item Mission Essentiality Codes (IMECs) were developed based on Military Essentiality Codes (MECs) and Mission Criticality Codes (MCCs). The IMEC represents the importance of an item to the mission assignment of the military unit in which the item is installed. Most items were assigned more than one IMEC value because each application of an item received an IMEC. The study focused on selecting a unique essentiality value for a National Item Identification Number (NIIN) by considering the various IMECs assigned to the item. The analysis was performed on 7G and 7H cognizance symbol (cog) material managed by the Navy Ships Parts Control Center (SPCC).

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